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CIA No. 433592

AN ANALYTICAL FRAMEWORK FOR A STUDY OF ECONOMIC WARFARE AS APPLIED TO THE EAST-WEST TRADE PROBLEM

(Paper Related to NIE-59)
Revised Draft

18 March 1952

Note

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CENTRAL INTELLIGENCE AGENCY
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AN ANALYTICAL FRAMEWORK FOR A STUDY OF ECONOMIC WARFARE AS APPLIED TO THE EAST-WEST TRADE PROBLEM

I. The Problems

As far as intelligence is concerned, the fundamental issue in East-West trade is: which side would suffer the greater damage from a further restriction of trade. Unfortunately, there are no simple or obvious analytical keystones about which study of this issue can be neatly built. Those that appear most obvious are likely to be most misleading. The "bottleneck" approach is a good example. Bottlenecks have a habit of disintegrating under careful scrutiny. Predictions that such and such a commodity is both irreplaceable and indispensable have without exception been proven false. Prospecting for bottlenecks is wasteful; apparent strikes will most certainly turn out to be fool's gold.

East-West trade policy is an important issue in the present cold war situation, but it is only one of many issues. Since intelligence personnel are limited, their use should be economized. Careful attention to defining the East-West trade problem and to framing the best ways for analyzing it may prevent a sizable wastage of intelligence effort.

It is important at the outset to disentangle two completely different types of damage that can result from trade restriction: damage in terms of general economic welfare and damage in terms of strategic welfare. In the context of the present problem, we can consider economic welfare of a country as dependent on the level of economic activity, i.e., upon real national income. A set of social objectives is encompassed in economic welfare, the particular set depending on the country in question but usually including such factors as well-being of the populace, economic development, and national security.

Strategic welfare, on the other hand, centers entirely about the issue of national security. The strategic welfare of a country depends on the capabilities of that country to promote its interests in international conflicts. In the context of the present problem, it can be defined as the war-making capabilities of one side relative to those of the other. War-making capabilities are clearly dependent, at least in part, on economic factors.

The fact that trade exists between East and West implies that both sides are benefiting in terms of economic welfare. Otherwise they would not trade. A country or region will engage in trade if the price of imported (exported) goods is lower (higher) than it would be internally in the absence of trade. These differences in price reflect differences among the regions concerned in their relative cost patterns. Trade makes it possible for each region to obtain a larger real national income than it would otherwise have.1/ That is, restriction of trade would cause a reduction in the rate of output of some goods that could not be fully compensated for through any reallocation of resources.2/

1/ Suppose that, in the absence of trade, in the West an additional yearly output of one ton of steel costs two tons of timber output. That is, two additional tons of timber could be produced if resources were not used to produce the additional ton of steel. This relative cost of two tons of timber for one ton of steel will tend to be reflected in a money price of steel that is twice the money price of timber. Suppose that, under the same circumstances, in the East a ton of steel costs four tons of timber. Then production of steel is cheaper in the West while, conversely, production of timber is cheaper in the East. Both sides would gain by trading steel for timber at some rate between one for two and one for four; and the rate of exchange would settle somewhere in that region. The cheapest way for the West to produce timber is to produce steel and exchange it for timber. Put in another way, the West gets more out of its given volume of resources by trading steel for timber. With appropriate verbal changes, the same reasoning applies to the East.

2/ This proposition and the others in this paragraph are not generally applicable to all possible economic situations. However, the more important qualifications probably do not apply significantly to East-West trade.

There is little point in raising the question of which side gains more from trade in terms of economic welfare, since the economic welfares of different countries are incommensurable, except in terms of arbitrary standards that are not relevant to the East-West trade problem. The pertinent question is: Which side gains strategically?

It is clear that if one side really gains strategically, the other side loses. Hence we define the concept of strategic welfare in relative terms: the war-making capabilities of one side relative to those of the other.3/ The relation between strategic welfare and economic factors is complex. The importance of different types of economic factors depends on, among other things, the general nature of the anticipated warfare, the length of warfare, and the date of onset. The economic capabilities for war will therefore depend in varying degrees on such things as types of commodities available, stockpiles, production rates, capital stocks, manpower, regional organization, and so on. Matters are further complicated because the actual strategy of warfare is never known perfectly by either side before the fact.

The existence of East-West trade implies nothing about possible gains of strategic welfare to either side. Consequently, we cannot know, without careful empirical study, whether further restriction or cessation of East-West trade would damage the strategic welfare of either side, even if we could calculate damage to economic welfare of both sides. Losses in economic welfare might not affect the war-making capabilities of either side or might reduce war-making capabilities of both sides in such a way that strategic welfare is unaffected.

3/ As determined by the likely war situation, strategic welfare might be considered as either the ratio of or the difference between war-making capabilities of the two sides.

The existence of East-West trade does imply something pertinent to the question of strategic welfare, namely, that at least one side is interested in economic as well as strategic welfare or that at least one side has miscalculated the true strategic context of warfare, hot or cold. If both East and West were interested solely in strategic warfare, trade between the two areas would take place only under special circumstances. Such trade as would increase the strategic welfare of one side would be bound to decrease the strategic welfare of the other, and the side that was made relatively worse off would refuse to play the game. If each side had perfect knowledge of the intentions, capabilities, and vulnerabilities of the other, trade would not take place at all.4/ This set of conditions implies not only that each side has all the necessary facts about the other but also that both sides have plans for military activities that are mutually consistent. If one side misjudges the intentions of the other or if either side is planning to fight a different kind of war than the other, then either side might believe that trade would increase its strategic welfare. For example, the West might assume that continued wheat imports from the Bloc would be necessary in order to maintain a level of industrial production sufficiently high to produce the required amount of defensive armaments. Since the Bloc is already strong enough to overrun Western Europe, additional supplies of strategic commodities (e.g., rubber) might be considered as worth less to the Bloc than the wheat exports of the Bloc are worth to Western Europe. On the other hand,

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4/ The only possible exception to this statement would be a situation in which trade increases the war-making capabilities of both sides in such a way that strategic welfare is unaffected. Besides the obvious consideration that this would be highly unlikely in point of fact for any particular trade pattern, it would also be necessary that both sides not be indifferent to economic welfare considerations. Saying that both East and West are interested solely in strategic welfare is not quite the same thing as saying that considerations of economic welfare are wholly irrelevant in all circumstances.

the Bloc might assume that the defense of Western Europe could not be significantly improved even with two years of additional preparation. Then any supplies of wheat shipped to the West would only go to build up a Western Europe that would be taken over by the Bloc anyway, and the rubber received in return would increase the present military superiority of the Bloc vis-a-vis Western Europe. Both sides would be willing to trade under such circumstances, since each believes that it is increasing strategic welfare.

Other circumstances in which trade could take place because of different intentions are fairly obvious. Suppose that the West anticipated that mass production of tactical atomic weapons would render tanks obsolete. Then it would be to its advantage to ship the Bloc all the tank-making materials that it could sell, in return for any materials that could be used in the production of atomic weapons. The Bloc, on the other hand, might be planning to make use of tanks as a major weapon in its military strategy. Both sides would again be willing to trade, each believing that it was increasing strategic welfare.

Trade could also take place if the side that could gain by trade restrictions found that the cost of initiating and enforcing the restrictions outweighed the gain. This factor of enforcement cost might also carry some weight in determining whether "selective" controls are better than "across the board" controls. An embargo on a commodity which has greater strategic value than the average for all traded commodities would, by definition, be more damaging (per unit controlled) than an indiscriminate embargo; but

the administrative burden 5/ could outweigh this gain.

Finally, trade could take place if either side had the objective of achieving the best combination of strategic and economic welfare. Under these conditions, one side might consider the gain in economic welfare to be sufficiently large to offset any likely loss in strategic welfare. In other words, all social objectives would not be wholly subordinated to war-making considerations.

On the basis of the foregoing reasoning and of general knowledge of the intentions of East and West, we can therefore assume that the current level of East-West trade exists because (1) at least one side, probably the West, is willing to lose strategic welfare in order to gain economic welfare; and/or (2) at least one side, again probably the West, is not certain whether further trade restrictions would improve its strategic welfare. The primary job for economic intelligence is to provide evidence that will help the West assess the wisdom of current decisions. Such evidence relates to measurement of changes in strategic and economic welfare that would follow on further restriction of trade.

As between the two problems, measurement of changes in economic welfare is by far the easier. Consideration need be given only to probable changes in total output in each area. It is obviously impossible to project the entire pattern of change that would actually take place following a reduction

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5/ Some of the elements of cost which would make this burden significant are:
(a) Intelligence organization manhours--analysis of the strategic value of particular commodities, formulation of licensing arrangements, accounting mechanisms, etc.
(b) Policing and patrolling manhours and transportation equipment.
(c) Administrative organization manhours necessary to keep track of results.

of trade, i.e., to trace through all the changes in output of all commodities. Such a projection would require at the very least complete knowledge of preferences for commodities, of amounts of all resources, and of all relevant technological factors. There are, however, two general yet meaningful methods for measuring losses in economic welfare, i.e., economic costs. First, we can estimate the likely fall in national income. Second, we can estimate the loss in terms of a bundle of resources, the losses from reduction of trade being taken as equivalent to the physical removal of this bundle of resources. 6/ The types of resources included clearly need not correspond to commodities entering into trade. Losses may be translated into any resources desired, the primary limitation being difficulties in acquiring data required for the translation.

By contrast the problem of measuring effects on strategic welfare is exceedingly complex. For the present problem, we are concerned with strategic welfare only in so far as it depends on relative economic capabilities for war. Economic capabilities are defined as any economic factors that enhance war-making capabilities. That is, economic capabilities for war will be increased through any change in economic conditions that increases war-making capabilities. Such a definition is admittedly vague, depending as it does on the meaning of "economic conditions" and "war-making capabilities." The following discussion will attempt to clarify the concept and to apply it to analysis of the East-West trade problem.

Economic capabilities must be defined within the context of the actual

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6/ If the bundle is aggregated by using value weights, the two measures come down to the same thing. They differ only if the bundle is expressed as a collection of physical units of sufficient resources.

warfare to be encountered. There are many dimensions to warfare: long and short, immediate and distant, local and general, limited and all-out, hot and cold, and so on. Economic capabilities appropriate to a war with one set of dimensions will not necessarily be appropriate to a war with a different set. One generalization can be made: war-making capabilities will be increased (reduced) by any economic factor that causes the inventory of munitions (defined in the broad sense) and the ability to maintain that inventory to be greater (smaller) than they otherwise would be at the pertinent point in time--provided other relevant factors remain the same. Relative inventories of munitions, together with relative abilities to maintain them, provide an approximation to relative economic capabilities and in turn to strategic welfare.

II. General Analysis of Strategic Damage from Trade Restrictions

We have already noted that a further restriction of East-West trade would impose economic costs on both sides. The next step is to consider the possible relations between economic and strategic costs. This relation will depend upon the amount of non-strategic "fat" in the economy. Four kinds of fat may be conveniently distinguished: (1) civilian, (2) contingency, (3) pipeline, and (4) developmental. These kinds of fat serve, in varying degrees, to cushion the strategic impact of economic losses.

Civilian fat consists of the resources allocated to the civilian sector in excess of those required to maintain an irreducible minimum consumption level. Civilian consumption is at the minimum level if any diversion of resources to other uses lowers the efficiency of manpower without providing equivalent offsetting gains elsewhere. Efficiency could be lowered directly

through malnutrition and the like or indirectly through disaffection. The output of consumer goods required to maintain a minimum consumption level depends on the size of inventories of consumer goods, the traditional living standard, and the willingness of the population to accept cuts in living standards as a patriotic duty. The actual minimum level is also obviously related to the period of time that it is to be endured: the shorter the period, the more drastic can be the cut in living standards. Consumer goods that form part of the minimum consumption level, as defined above, are clearly strategic; any reduction in their supply would impose a strategic cost. Hence, if the level of civilian consumption in the economy in question is at an irreducible minimum and if no other nonstrategic fat exists, then the loss of any imported commodity immediately imposes a strategic cost, since the resources needed to replace this commodity must be withdrawn from productive activity geared directly to demands of the war economy or to minimum demands of the civilian sector. On the other hand, to the extent that civilian consumption exceeds the minimum level, loss of imports will impose strategic costs only during the period required to move excess resources away from the civilian sector.

In the absence of fat in the civilian economy, all other kinds of fat can serve merely as shock absorbers, relieving immediate pressure on war-making capabilities and postponing full strategic costs to a future period. They can serve to alleviate and postpone, but not to eliminate, strategic costs. Strategic stockpiles are an example of materials accumulated for contingencies like trade reductions. Drawing on such contingency stockpiles will cause strategic costs, following a reduction in trade, to be lower

than otherwise. However, drawing on contingency stockpiles cannot eliminate strategic costs, for some strategic costs have been incurred as the result of accumulating the stockpiles. That is, the inventory of munitions is lower than it would otherwise have been. Materials in the industrial pipeline provide an even weaker offset. The most that can be gained by draining the pipeline is a postponement of strategic costs. In fact eventual costs may be higher than otherwise because of the secondary effects of draining pipelines. Absorbing costs by shifting resources away from net capital formation also provides nothing more than a postponement of strategic costs.

We are now in a position to trace through the general pattern of strategic costs incurred by reduction of trade. For convenience, we shall consider only a complete severance of trade, although the analysis, with appropriate verbal changes, will apply equally well to a partial severance. The Soviet Bloc will be taken as the area in which costs are to be measured. Unless otherwise noted, we shall assume throughout that there is no fat in the civilian economy. All costs will therefore be strategic costs, some being incurred immediately and the rest at some future time. The Bloc will attempt to minimize the aggregate costs over an appropriate period of time, with an appropriate pattern of costs within that time period, the aggregate costs depending in part on that time pattern. The appropriate time period and pattern of costs will be determined by the strategic context. The relevant minimum costs are those that would have to be incurred in order to fully replace lost imports. The costs can be measured by the reductions in outputs of other commodities, aggregated over the appropriate time period,

that would have to be forgone if lost imports were to be fully replaced. 7/ One set of reductions could be made without in fact being forgone, namely, the amounts of commodities formerly exported. Loss of these commodities would not be a cost, since nothing would be given up that had not already been given up. For reasons pointed out earlier, imports could not be fully replaced by using only resources employed for production of exports. Hence outputs of some other industries supplying end-items, all of which are considered strategic in the present context, must be reduced. These aggregated forgone outputs can be translated, as practicable, into any set of resources desired. 8/

The Bloc could follow either of two extreme paths for replacing imports. The first extreme would be to embark on a net investment program designed to increase productive capacity in the economy sufficiently to produce the lost imports without any further net diversion of resources from other uses. If such a program could be achieved instantaneously, the full cost of replacing imports for the indefinite future could be borne immediately.

7/ Replacement of imports means replacement with identical or equivalent items. It also means, unless otherwise noted, replacement over and above that which can be accomplished by eliminating production of former exports.

8/ The outlined concept of costs is not intended to describe the actual pattern of behavior to be expected in the Soviet Bloc following a reduction in trade. The concept sets forth the cost of trade restriction as equivalent to the physical removal of a block of resources over a specified period of time, the block of resources being determined on the basis of the economic pattern prevailing immediately preceding the trade restrictions. The Bloc might not in fact choose to fully replace imports or to eliminate production of all former exports. Being faced with a new set of alternatives and hence with new relative valuations for different commodities, the Bloc might choose any one of innumerable paths of adjustment, the path chosen depending on preference patterns, availabilities of different resources, and technological factors.

The mathematical reader will note that aggregation of costs means integration of cost rates over a specified time period. That is, aggregate cost is the integral of cost rates at all points within the time period.

Although the program would, of course, require time to complete, it would still be true that, as net investment took place, the cost of replacing imports would be incurred once and for all time.

The second extreme would be to make no attempt to increase the productive capacity of the economy. In this case, the cost of replacing imports would be borne during every time period in the indefinite future in the form of reduced rates of output somewhere in the economy. Hence there are two types of costs to be distinguished: lump sum, nonrecurrent net investment costs, i.e., "real" saving; 9/ and recurrent rates of cost. Some combination of the two extremes would be the path that would minimize aggregate costs over an appropriate period of time and that would also represent the optimum time pattern of costs. The nature of that path will be determined by the strategic context and technological factors.

If the strategic context is such that the critical period will occur very shortly (say, one year) after trade reduction and will persist for a short time (say, less than five years), a net investment program is essentially ruled out. 10/ The aggregate costs, calculated at any point, will be lower if net investment is not undertaken. With such a short adjustment period, the rate of cost might be quite high, perhaps initially exceeding the value of all imports. It is within this context, and only within this context, that the "bottleneck" approach is applicable. If

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9/ The investment must be net for the economy as a whole, involving an actual increase in total productive capacity for the whole economy. If productive capacity is increased in the import-replacing industries by diverting capital resources from other sectors, the costs incurred are of the second type.

10/ The analysis here is based on incomplete war-gaming. The strategic context and economic capabilities are obviously interdependent. A change in economic capabilities will probably affect strategic planning, and vice versa. The analysis is correct if changes in economic capabilities are so slight as not to affect strategic planning or if the analysis is considered as applying to the final stage of a series of successive approximations to the optimum relation between strategic context and economic

the output of strategic end items is highly dependent on imports, then loss of imports can temporarily impose disproportionately large losses of end items until substitutes are made available. "Substitute" can mean anything from a commodity with identical technical characteristics (e.g., synthetic for refined gasoline) to a completely different commodity that can substitute in some, but not all, uses (e.g., steel for copper in large ammunition casings). Strategic stockpiles of imported items provide one source of identical substitutes. Depletion of these stocks would be the same as continued importation and hence the strategic costs would be quite low, provided only that stockpiles had been accumulated for such contingencies. 11/ The other source of substitutes is diversion of resources, including costless diversion from export industries. Substitution in this manner essentially involves changing the forms of resources. Plants in the export industry must be changed into plants in the import replacing industry; substances completely foreign to imports must be made into "synthetic" imports, through new production techniques to be discovered through industrial research; production techniques must be changed so that new materials can be used in place of imports; manpower must be retrained to possess new skills; and so on. Such transformations require time and resources. In general, the shorter the time allowable, the greater the resource cost per unit of results. Hence, with a very short adjustment period, it might be possible only to widen the bottleneck a little by using costly and inefficient substitutes. On the other hand, intensive mobilization of resources to attack the bottleneck may succeed in breaking the bottleneck within an amazingly

short period of time. Experience with German productive accomplishments in the face of a continuous embargo indicates the danger of underestimating the adaptability of an economic system. Soviet progress in atomic energy is another case in point.

Rubber is an outstanding candidate for the position of an unbreakable bottleneck. It is apparently impossible with present technology to produce a good synthetic rubber without using some natural rubber. Hence there is a strong temptation to argue that cutting off natural rubber will eventually have disastrous effects throughout the economy. There are two things wrong with this argument. First, synthetic rubber can be made without natural rubber; it is simply a very costly substitute in that it wears very poorly. Second, and by far more important, a "pure" synthetic would almost certainly be discovered within a reasonably short time if disaster were the alternative. The fact is that we cannot reason by analogy from current success in research. With natural rubber available in current imports and in stockpiles, it simply may not pay to devote a large quantity of scarce research and development resources to searching for a "pure" synthetic. With no imports of natural rubber and stockpiles being depleted, the entire picture changes. It now becomes worth while to launch a major research effort. Costs of production that might have seemed prohibitive before become "low" under the new circumstances. The result is likely to be discovery of some good substitute for natural rubber within a reasonably short span of time. Predictions to the contrary for other commodities have been proven almost universally wrong in the past.

The longer the adjustment and critical periods, the more advantageous becomes early launching of a heavy net investment program. Bottlenecks lose much of their importance since they can be broken before onset of the critical period. 12/ The rate of costs will tend to move to a peak very early in the adjustment period, thereafter declining rather steadily. Costs will be of a twofold nature: (1) reductions in supplies of imported items and induced reductions in outputs of end items and (2) reductions in other outputs (excepting exported items) caused by the import replacement program. The optimum time pattern of costs will depend on the amount of shock absorption built into the economy and on the mobility of resources. Mobility depends primarily on the degree of specialization of resources that must be moved about. Highly specialized resources, such as a steel mill or a highly skilled toolmaker, can be "moved" only very slowly, by not replacing the mill as it wears out or by retraining the toolmaker. 13/ It might be well worth while to endure a rate of cost in the adjustment period substantially higher than the rate with no adjustment, if, by so doing, the eventual rate of cost were substantially reduced. The longer the adjustment is postponed, the greater will be the accumulated loss of strategic end items. There

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12/ This statement, and the succeeding analysis, would not hold for a small country with a primitive agricultural economy and sparse natural or industrial resources. However, a large economic unit possessing diversified resources, such as the Soviet Bloc or the West, probably could, given sufficient adjustment time, break any bottleneck. This is not to say that no cost would be incurred in the process. It is merely to say that the cost would be widely diffused, among activities and over time.

13/ In some cases, the resource may simply be "lost," that is, put to no use at all, because it is so highly specialized to activities that must be discontinued.

is some rate of adjustment that will minimize aggregate costs over the combined (allowable) adjustment and critical periods. 14/

This general discussion can be concluded with a brief discussion of the strategy of trade restrictions. We must eward of the temptation to consider an item strategic simply because it has a direct usefulness to the military or because it enters into the "last" stages of production of military end items. Such a presumption disregards the interdependence of all parts of an economic system. Exports of rifles can be banned while cotton is allowed to proceed. The resources released from domestic production of cotton might, after some time lag, produce more rifles than could have been imported. The same argument can be applied to the effect of cutting off supplies of any commodity that forms a link in the chain of production relationships. From a long-run point of view, it matters little whether we reduce shipments of airplanes, of machine tools used in stamping aluminum parts, of steel used in making machine tools, of cobalt used to temper the steel, or of food required by the cobalt workers--unless the criteria in the following paragraph apply differently among them. Cutting off any of these items would eventually affect the inventory of airplanes if no counter-balancing measures were taken. Only from a very short-run point of view,

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14/ The foregoing discussion is based on the assumption that incidence of high costs will not shock a country into extraordinarily rapid technological advances. It might well be argued that the stimulus of being forced to think out allocation and technical problems in a new situation might induce widespread technological progress that would otherwise be absent. If so, in the long run war-making capabilities might increase rather than decrease. In any event, strategic damage would be ameliorated. In order for such a result to occur, however, the technological advances that were stimulated would have to overbalance the slowing down of technological progress in other areas resulting from diversion of limited research and development facilities and personnel. Such an overbalancing is considered as highly unlikely.

is closeness to the end-item stage of production significant. Cutting off cobalt, which is far back in the production stream, would affect the airplane inventory much later than cutting off airplanes themselves, since production would continue for some time of the basis of materials in the industrial pipeline.

The primary problem is to determine criteria for selective trade restrictions. For a strategic situation of moderately long to long duration, the criteria are fairly obvious: first, the item to be restricted should be highly specific to the military sector of the economy, that is, only significant amounts should be currently used directly or indirectly in the production of civilian goods; second, imports should constitute almost all of the quantity currently consumed; third, substitutes should be as costly as possible to produce. Few generalizations can be made as to the types of items that would fall in these categories in the Bloc or in the West, except for items obviously excluded, like face powder and gum drops. Each item must be considered separately. Under any likely trade pattern, there is some set of items, comprising less than total trade, whose complete embargo would inflict more strategic damage than an across-the-board reduction of trade equivalent in value. This set can be found, if at all, only through careful examination of the probable effects of embargo of alternative sets of items.

III. Methods of Measuring Strategic Costs

Strategic costs can never be measured with the precision and accuracy implied by the foregoing discussion. Measures must, of course, be tailored to fit existing economic data. Two kinds of information can be used, although both are not always applicable to every economy: the first is money costs of production; the second, resource costs. In an economy in which the price system plays a significant role in allocating resources among their many alternative uses, money costs are simply a generalized expression of resource costs. 15/

The calculation of strategic costs in either terms must proceed through several steps. The most convenient starting point is to calculate the rate of costs after all desired and possible rearrangements of resources have been made. We can think of this as the basic estimate of costs. Although the basic estimate obviously gives only part of the story, use of it in the initial stages of measuring costs is desirable because it can be subsequently adjusted to reflect any set of circumstances in the transitional period that might be dictated by the strategic situation.

Let us consider first the procedure for calculating the strategic costs to the West in monetary terms. The basic estimate of annual economic costs would be the annual cost to the West of producing all former imports, or equivalent substitutes, minus the annual cost to the West of producing all former exports. The latter cost is approximated by the value of Western exports at the time that trade is severed. The former cost is much more difficult to come by. If imports are also produced somewhere in the West,

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15/ That is, within technical limits resources can be substituted for each other without reducing output at about the rate represented by their relative prices.

a first approximation to costs is the value of imports, though this figure will clearly understate the costs that would obtain in the absence of trade, and must therefore be adjusted upward on the basis of such technical and economic information on internal costs of production as can be found.16/ For imports that have not been produced domestically, the estimate of costs of producing them or equivalent substitutes must be constructed from scratch.

Annual strategic costs will be that part of annual economic costs that can not be offset by diverting resources from civilian consumption, i.e., by civilian fat. In order to get at strategic costs to the West, therefore, it is necessary to estimate the value of all resources used in the civilian sector and the value of those resources required to support the population at an irreducible level of consumption. The most feasible approach is to telescope the two estimates into one: the amount by which civilian goods and services can be reduced without seriously affecting morale and/or productivity.

The strategic costs derived in the above manner represent the rate of costs that would be expected to prevail after a reasonably long adjustment period. It is clear that they understate the rate of costs during the adjustment period but, as pointed out earlier, certainly not to the extent suggested by most "bottleneck" theories. The important factors to be considered here are the size of strategic stockpiles, the extent of other built-in shock absorption (e.g., developmental fat), and the rate at which resources can be shifted from export industries and the "surplus" civilian

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16/ Transportation costs must, of course, be included. Under some conditions, these costs override all others, as in the case of a major shift in the geographic location of production. For instance, if Japanese imports of coal and iron must come from the Western Hemisphere instead of China, the increased transportation costs might easily exceed the former total cost of these items.

economy. In general the shorter the adjustment period, the larger will be the difference between actual annual strategic costs and the basic estimate. It may indeed be quite impossible to make any quantitative calculation of the difference. It may be possible to make only a very broad statement, such as: average annual strategic costs over a five year adjustment period could be expected to be roughly 125% to 150% of the average annual costs over a ten year adjustment period.

The final problem in measuring strategic costs is the estimation of aggregate costs over the critical strategic period. If the entire critical period, including the time allowed for productive adjustment, is reasonably short (e.g., less than fifteen years), minimum aggregate costs will be the sum of the annual costs over the period. If the critical period is long (e.g., more than fifteen years), minimum aggregate costs will be the cost of a net investment program designed to increasing productive capacity of the economy sufficiently to replace all lost imports. The cost of such a program is twofold: first, the cost of capital formation itself, including training of labor; second, the strategic cost incurred during the investment period. 17/ The longer the critical strategic period, the less important it becomes to include the second factor in calculation of aggregate costs.

The foregoing reasoning applies step by step to calculation of strategic

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17/ The costs of capital formation are, of course, exclusive of total value of resources transferred from export industries or the "surplus" civilian economy. If we can assume that resources have been rationally allocated, one method of computing the construction costs would be to capitalize "eventual" annual strategic costs (i.e., more than would prevail after all productive adjustments had been made) at the net productivity rate of capital. For instance, if eventual annual strategic costs were $12,000,000 and the productivity rate of capital were 6%, the cost of capital required to replace lost imports would be $200,000,000. The strategic costs incurred during the investment period are the net costs caused by loss of imports during the investment period, exclusive of costs of capital construction.

costs in terms of specific resources. Instead of calculating costs in monetary terms, they are calculated in terms of specified quantities of specified resources used in the production of imports, exports, consumer goods, or capital. For instance, the cost of producing an import (e.g., steel) would be taken as the quantities of resources used in the production of steel (e.g., coal, labor, iron ore). Except for this difference, the procedure is the same. It should be pointed out, however, that data on resource costs are almost certain to be fragmentary and incomplete, much more so than money cost data in economies in which both can be found.

One important problem has been skirted in the discussion to this point, namely, the problem of measuring strategic costs in the Soviet Bloc and in the West so that they are comparable. There is no single best solution to this problem, suitable for all purposes. The nature of the comparability problem is determined by what we are looking for. For instance, we may wish to know merely the direction, but not the degree, of change in strategic welfare for both sides. If the ratio of war-making capabilities is considered a good index of strategic welfare, then an increase in strategic welfare for the West, and a decrease for the Bloc, is indicated if strategic costs are a smaller fraction of war-making capabilities for the West than for the Bloc. In this case there is no problem of comparability of measurement as between the West and the Bloc. If, on the other hand, we wish to know the degree of change in the ratio of, or in the difference between, war-making capabilities of the West and the Bloc, the problem of comparability enters immediately. Money costs can, of course, be translated into a

common measure by using an appropriate exchange rate. 18/ Resource costs for the Bloc and of the West cannot be directly compared. Hence, to some extent, the problem of comparability cannot be solved.

IV. Analysis of Costs to the East and West

The discussion up to this point has avoided reference to specific factors in the East and West that might shape their patterns of reaction to restrictions of trade. In order to say anything about these factors, we must first know what areas are included in East and West and how significant their trade is. For purposes of a general study of East-West trade, it seems best to divide the world between the two parts, the East including the entire Soviet Bloc 19/ and the West including the rest of the world. Trade each way in 1950 amounted to about $1.5 billion. This figure compares with a gross national product of about $125 billion in the Soviet Bloc and about $450 billion in the rest of the world. Placed in this perspective, severance of trade would not seem to pose a sizable problem for either the East or West. The comparison of trade and GNP is useful primarily as an indication of the long-run problem created by severance of trade. Such a comparison sheds little light on the strategic importance of trade in the immediate future or over the moderately long run.

Since the size of the economy, the extent of diversification, and the store of technical knowledge are all much larger in the West than in the East, it seems quite likely that, political considerations aside, the ultimate cost of trade restriction would be greater in the Bloc. The

18/ The many problems associated with choosing the right exchange rate fall outside the scope of this paper.

19/ USSR, European Satellites, and Asiatic Satellites.

greater diversification of resources and store of knowledge in the West means that the West can more readily adapt to loss of any particular resource, since that resource will have closer substitutes in the economy. That is, resources can be thought of as arrayed in a spectrum on the basis of their substitutability, one for the other. The Western spectrum has fewer gaps than the Eastern, and the cost 20/ of plugging a particular gap in the spectrum is consequently lower.

Through trade the Bloc has enjoyed the use of highly specialized capital equipment, highly skilled labor, and complex technical know-how that are all scarce inside the Bloc. By copying one prototype machine the Bloc is now able to tap literally scores of years of techincal, engineering, and industrial research experience. It would be very costly for the Bloc to be forced to duplicate this experience within a relatively short span of time instead of being allowed to purchase the proven fruits of experience. On the other side, the West has a much broader base of industrial activity and know-how to draw upon in replacing lost imports. This broader base includes not only such factors as wide technical experience, diversified and widespread skill in the labor force, and an efficient organizational technique; but also a vast quantity of industrial capital in the nonessential sector that could readily be converted over to use in essential production. So far as economic factors are concerned, the West is in a much better position to

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20/ The discussion in these paragraphs has not distinguished explicitly between economic cost and strategic cost. As noted before, this difference hinges, in the long run, on the existence and density of civilian fat in the economy, and in the short run on shock absorption factors and mobility of resources. The reader can translate economic into strategic for himself, depending on the assumptions that he cares to make.

provide for "self-sufficiency" than the Bloc.

It should be noted that the specific types of imports going to the Bloc (West) do not necessarily matter so far as relative replacement cost is concerned. The fact that the Bloc is importing highly fabricated industrial goods, while the West is not, does not imply the Bloc would be hit harder by the trade restriction. It might be, for example, that an area importing basic raw material foodstuffs would be more damaged by a trade restriction, since the particular resources needed to replace the (essential) foodstuffs might be relatively more scarce than the resources needed--by the other area--to replace highly fabricated goods. The only function served by a discussion of the specific types of goods imported is to indicate which types of resources are relatively scarce in the two areas. We cannot draw any conclusion from this about the relative cost of replacement, except as it is possible to point out instances in which resources that can be used only in the production of particular exported commodities would be lost to the economy if export production were to be discontinued as a result of the trade embargo.

Although the Bloc might be hurt more than the West in the long run, it is not at all certain that the impact would be felt as quickly in the Bloc. The USSR has long been oriented toward continuing warfare and has presumably built substantial shock absorption into its economy. Probably as much as five percent of Soviet national income has been devoted to industrial reserves in each postwar year, and a large portion of those reserves is undoubtedly set aside for strategic stockpiles. Soviet planning probably has not only anticipated a severance of trade but also looked upon ultimate severance as desirable.

In fact Soviet trading policy could quite reasonably be characterized as trading for the purpose of eventually severing trade. At the same time it would be a serious mistake to suppose that the West is wholly unprepared to cushion the blow of trade severance. It too has had a stockpiling program, at least over the last year and a half. Even more important is the inherent diversification and organizational flexibility in the principal economies of the West that can serve to soften the blow. As between the East and West, there is little question that the organizational mechanism of the Western economy, primarily the market pricing system, is much more efficient in quickly diffusing the shock of disturbances to less important sectors of the economy.

Another important dissimilarilty in the effects of trade restriction on East and West should be noted. In this paper it has been assumed that the West would be the area initiating and enforcing the trade restriction policy. 21/ The cost of this enforcement must be borne exclusively by the West, such costs including the resources required to police trade channels, to gather information on illicit trade, to administer control devices, to formulate

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21/ It is clear that a trade restriction policy would have to be strongly enforced. The strategic cost to the Bloc consists of the resources needed to replace imports by domestic production. If these imports could be replaced by illicit trade, the loss would be reduced by the difference between the resources needed to produce the means of payment for illicit imports and the resources needed to replace the imports by domestic production. One means of payment for illicit imports would be gold, which the Bloc has in substantial quantities. The cost involved in using up this gold stock is quite small, since the alternative uses of gold--other than procurement of goods--are rather limited.

policies, and so on. 22/ These costs might be high enough to eat away a significant portion of the strategic gain from trade restrictions.

Another difference occurs in the role of the price system in both areas. Money costs do reflect actual resource cost in the West; they do not so in the East. At least we know very little about the relation between price and actual cost. We have scarcely any alternative for the Soviet Bloc other than measuring costs in terms of specific quantities of specific resources. We cannot directly compare strategic costs in the two areas, since there is no way of translating the resource costs in the Soviet Bloc into equivalent costs in the West. The measure of relative damage we come up with is therefore the money cost that the West must bear in order to inflict resource costs on the Bloc.

As far as strategic warfare is concerned, it would seem that the West would rather clearly gain from severance of trade. There is little evidence to suggest that the Bloc has any significant amount of civilian fat. The civilian economy probably has already been squeezed to the limit feasible under cold war conditions. Hence loss of imports is certain to improve strategic costs. The criterion does not hold for the West. It is highly likely that civilian fat could absorb the entire cost of trade restriction. If the depth of civilian fat amounted to only one percent of the gross output of the West, four and a half billion dollars worth of resources would be available for replacing lost imports (presently valued at less than a third

22/ It might appear that the costs of a tight policing policy would be partly offset by the premium prices received by Western traders for smuggled exports. Such offsets are however illusory for at least two reasons. First, the smuggling need not be in both directions. If no goods move into the West while goods move out, it is clearly worse off regardless of the size of black market (money) profits of its traders. Secondly, bilateral smuggling could improve the position of the West only if the shift in terms of trade were drastically in its favor and the amount of smuggling were substantial. If these conditions hold, the West would be better off by relaxing rather than stiffening trade controls. That is, the West had made a mistake by restricting trade too much.

of that amount) without inflicting strategic costs. Even if the entire burden were shifted to the US, a depth of civilian fat amounting to one percent of US national income should mean a cushion of three billion dollars worth of resources. It would therefore appear, without any further study, that the West has everything to gain and nothing to lose by severing East-West trade.

The answer is, however, not quite so simple. We have overlooked the fact that, if the West were willing to accept a reduction in civilian consumption after trade severance (imposed by the West), then it should also be equally willing to accept the same reduction while trade is going on and to shift released resources to the war economy. Trade severance will improve the strategic welfare of the West only if the resulting deadline in war-making capabilities of the East overweighs the increase in war-making capabilities of the West that could be achieved without trade restrictions but with a reduction in civilian consumption of the West equivalent to that which would be imposed by trade restrictions. We have also overlooked the fact that large portions of the West might not be willing to suffer the necessary reduction in living standards in order to improve their stratetic welfare. The price the West must pay, in terms of reduced living standards, will play a large part in determining how much strategic welfare it will be willing to "buy" through restricting East-West trade. For both reasons, the advisability of the West taking the initiative in further restricting trade can be ascertained only after probable costs, strategic and other, to both sides have been carefully assessed.